



# Associations between Emotion Regulation and Parental Reflective Functioning

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## Abstract

Emotion regulation encapsulates the capability to successfully manage an ongoing emotional experience, particularly in social interactions, and thus may be especially significant to early parent-child relationships. In particular, the capacity to adjust emotions may support parental mentalization and reflective functioning – how parents think about their own and their child’s mental states and how these mental states effect behavior. To examine this issue, we investigated the association between emotion regulation, emotion dysregulation, and parental reflective functioning in a maternal sample ( $N = 97$ ). We found that mothers with higher tendencies to suppress their emotions and who had more difficulties with emotion regulation engaged in greater levels of pre-mentalizing (i.e., a non-mentalizing mode). Mothers with poorer emotional awareness also evidenced less interest and curiosity in their child’s mental states. Finally, mothers who reported greater difficulty setting goals also evidenced a reduced capacity to recognize that their infant’s mental states are not directly observable. Taken together, our findings support the relationship between different aspects of emotion regulation and maternal reflective functioning, suggesting that emotion regulation should be integrated in empirical and intervention work that targets maternal mentalization.

**Keywords** Motherhood · Emotion regulation · Parental reflective functioning · Mentalization · Parenting

Emotion regulation can impact almost every facet of an individual’s functioning, especially during interpersonal interactions. There is an increasing focus on the variability in how individuals can exercise substantial power over their emotions concurrent with emotion dysregulation difficulties as essential components to a number of clinical disorders (Aldao et al. 2010). Lifespan perspective methods have been implemented to understand how emotion regulation and dysregulation may be communicated across generations from parent to child (Bridgett et al. 2013 Martins et al. 2018). Especially during early infancy, parental emotion regulation is particularly important since a child’s main form of interaction is non-verbal, with feelings of distress expressed through crying. Severe sleeping and crying problems also affect approximately 20% of infants (Hemmi et al. 2011). Therefore, a particular challenge for parents is

to preserve their own regulated state while also tending to the needs of their distressed and dysregulated infant. Indeed, experimental studies of tolerance of infant cries have evidenced significant variability in how mothers endure infant distress (e.g., Rutherford et al. 2013). The ability to adjust one’s own behavioral and emotional reactions aids parents in responding appropriately to their infant and to nurture experiences for a supportive family environment (Morris et al. 2007). Consequently, it has been argued that emotion regulation plays an important role in childrearing, enabling thoughtful and adaptive caregiving, and supporting the nurturance of the developing infant (Rutherford et al. 2015b). Due to the far-reaching effects of dysfunctional parenting practices on a child’s development of emotional and behavioral problems (Sanders 2012), it is important to investigate parental emotion regulation during the particularly challenging time of infancy and early childhood.

There are several different strategies parents can employ to maintain a well-regulated state. The process model of emotion regulation differentiates between emotion regulation approaches by their stage of application, with a particular emphasis on cognitive reappraisal and expressive suppression (Gross 2002; Gross and John 2003). Using the

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approach before or as the emotion is experienced, labeled cognitive reappraisal, is described as the reframing of a situation before or soon after an emotional response has been triggered to modify the strength of the emotional experience (Gross 2002). Using the approach following the emotional experience, labeled expressive suppression, comprises a method by which the individual adjusts a behavioral response to an already triggered emotion (Gross and John 2003). Reappraisal therefore affects both the experience and expression of emotion whereas suppression affects only the expression of the emotion after that emotion has been elicited (Gross 2002; Gross and John 2003). The practice of reappraisal is associated with more experience and expression of positive emotion and reduced experience and expression of negative emotion; however, engaging with expressive suppression is associated with the diminished manifestation of positive and negative emotions (Goldin et al. 2008; Gross 2002; Gross and John 2003). Although the process model of emotion regulation primarily focuses on adult emotion regulation, these strategies are still employable by parents in their caregiving role. For instance, cognitive reappraisal may be beneficial to parents when readjusting their behavioral response to better attune to their infant's needs. Employing expressive suppression may also be valuable to prevent parents from becoming overwhelmed in the moment when their infant may be particularly distressed. Given that parental emotion regulation may scaffold the development of their own child's emotion regulation (Bariola et al. 2011), a parent who experiences difficulties implementing emotion regulation strategies in response to emotionally-charged conditions related to childcare may impact both their own, and their child's, well-being (Kashdan and Rottenberg 2010).

Observing the experiences of how caretakers show emotions and interact throughout emotional circumstances, children learn how to regulate their own emotions (Parke 1994). While some approaches have examined the implementation of emotion regulation strategies (e.g., Gross and John 2003), another approach is to measure whether efforts to modulate emotional experiences may be dysregulating (Gratz and Roemer 2004). Emotion dysregulation manifests as avoidance, rumination, and emotion suppression, which can lead to difficulties adapting to stressors in the environment (D'Agostino et al. 2017). While emotion regulation strategies may have positive and negative impacts on parent-child relationships, emotion dysregulation in particular may disrupt the child's emotional development. For example, parents responding negatively to their children's displays of emotion can heighten the child's emotional arousal and teach them to avoid negative emotions rather than understand and express them appropriately (Eisenberg et al. 1998). Additionally, mothers who frequently express negative emotion have children who exhibit poor emotion

regulation due to the child internalizing and modeling the parent (Eisenberg et al. 2001). The cyclical nature between parental negative regulation strategies and child emotion regulation highlights the importance of needing a more complete understanding of parental difficulties when trying to regulate their emotions. Thus, it is necessary to move beyond measuring the implementation of specific strategies but to include assessments of the different dimensions of emotion regulation that may lead to emotion dysregulation. This may include understanding the extent to which individuals are aware and accepting of their emotions, their clarity in understanding how emotions make them feel, and how disruptive emotions are to completing goal-directed behaviors (Gratz and Roemer 2004). Furthermore, knowledge of emotion dysregulation may be valuable to motivating new intervention approaches that harness different dimensions of emotion regulation, beyond the employment of specific emotion regulation strategies such as cognitive reappraisal.

Parents may shape their children's capacity to regulate emotions through multiple pathways. Morris et al. (2007) propose an observational learning paradigm, arguing that parents provide models of emotional displays through which children learn firsthand the expression of emotion in terms of valence, duration, and intensity. Some evidence suggests a genetic component in the development of emotion regulation in children (Eisenberg and Morris 2002), but there is a broad consensus that the family, and parents in particular, may shape this critical ability (Bariola et al. 2012; Bridges et al. 2004; Zeman et al. 2006). Other significant cognitive abilities associated with positive outcomes for child development may be fostered by the capacity for adaptive emotion regulation. In particular, mentalization and reflective functioning (i.e., the overt measure of mentalization; Fonagy et al. 2002) are believed to be supported by emotion regulation. Mentalization is described as the ability to comprehend and infer—implicitly and explicitly—one's own and others' behavior as an expression of mental states, such as feelings, thoughts, fantasies, beliefs, and desires (Fonagy et al. 2002). This concept enables understanding of both the self and the other, which allows predictability in social exchanges, the development of relationships, and adaptive navigation of social interactions (Fonagy 2006).

Mentalization may be influenced by relationships, which has led to assessments of parent-specific reflective functioning to more fully understand the quality of the dyadic relationship and positive outcomes for child development (Slade 2005, 2007). Given that early communication between the parent and child is limited to a non-verbal level, requiring parents to interpret the child's inner world through observation of the child's behavior and affective signals, the capacity to mentalize is of particular interest to parenting

research in early infancy (Luyten et al. 2012; Rutherford et al. 2013). Parental reflective functioning is thought to play a role in the child's own capacity to mentalize, and through effective mirroring of the infant's affect the parents could lay the foundation for attachment security, affect regulation, and self-control (Ensink and Mayes 2010; Slade 2005). Consistent with this notion, parental reflective functioning has been implicated in children's attachment security (Fonagy et al. 1991) and the observed behavior of mothers (Grienenberger et al. 2005).

Conventionally, attachment (Fonagy et al. 1998) and parenting (Slade et al. 2005) interviews assess parental reflective functioning. While these interview-based approaches offer a significant quantity of qualitative information that can be coded to indicate levels of reflective functioning, they are limited by the demands of timely administration, transcription, and coding when enrolling large samples of parents. To address this implementation limitation, the 18-item Parental Reflective Functioning Questionnaire (PRFQ; Luyten et al. 2017) was developed to assess different aspects of parental reflective functioning. The PRFQ measures three main components of PRF. First, that parents vary in their levels of interest and curiosity regarding their child's mental states. Second, that parents evidence variability in their certainty regarding their understanding of the child's mental states. Third, many parents evidence pre-mentalizing (or non-mentalizing), wherein parents may be unable to mentalize about their child, which might manifest as developmentally insensitive or inappropriate interpretations of their infant's mental states and expressed behavior. While these PRFQ subscales have been implicated in measures of emotional availability (Luyten et al. 2017), there is scant data regarding the relationship between parental reflective functioning and emotion regulation. However, previous research has evidenced that parental reflective functioning is associated with distress tolerance, a construct related to emotion regulation (Rutherford et al. 2013; Rutherford et al. 2015a).

In the current study, we investigated the relation between emotion regulation and maternal reflective functioning in mothers within the first two years postpartum. While we have decided the directionality based on current theory (i.e., that emotion regulation scaffolds reflective functioning), the relation between emotion regulation and reflective functioning may be interactive. Nevertheless, for the purposes of this investigation, we reasoned that parents need to maintain a regulated state during their infant's experience of distress to sensitively respond to their infant's behavior. Therefore, adaptive emotion regulation may facilitate parental reflective functioning. To explore this relationship, in a community sample of women, we examined the associations between measures of emotion regulation strategies, emotion dysregulation, and parental reflective functioning. We

specifically targeted cognitive reappraisal and expressive suppression since they have been operationalized as common emotion regulation strategies in adulthood (Gross and John 2003). Our central hypotheses were: (1) Cognitive reappraisal would be associated with higher levels of maternal interest and curiosity and certainty in their infants thoughts and feelings while expressive suppression would be associated with higher levels of maternal pre-mentalizing; and (2) Emotion dysregulation would be associated with decreased levels of maternal interest and curiosity as well as certainty in their infants thoughts and feelings, accompanied by higher levels of maternal pre-mentalizing.

## Method

### Participants

The Human Investigations Committee at Yale University School of Medicine approved all procedures before recruitment commenced. Demographic data from 97 local mothers ( $M$  age = 28.14 years,  $SD$  = 6.64) is presented in Table 1. The majority of mothers identified their ethnic background as African American (49.5%), followed by 25.7% Caucasian, 12.9% Hispanic, 7.9% Other, 3.0% Asian, 1.0% American Indian, and 2.9% unreported. Mothers completed an average of 13.25 years of education ( $SD$  = 2.88). Infant ages ranged from 1 month to 18 months ( $M$  age = 6.14 months,  $SD$  = 3.29) in Study 1 and Study 2. Study 3 recruited mothers with infants younger than two years of age; however, owing to technical issues, infant age was not collected. All women provided written informed consent and were compensated for their time.

### Procedure

This was a secondary analysis of data from three independent studies that were collecting the ERQ, DERS, PRFQ, and a demographic form, studies which were completed to measure variation in parenting in the initial two years postpartum. Women were primarily recruited for each study by flyers posted in the local community. Each study sample was verified to ensure that participants were unique, and cases were removed if an individual had participated in more than one study. Nevertheless, the study number (1-3) was also examined in the analyses in case of an unknown contextual factor of study type on our dependent measures. Notably, maternal education level was slightly higher in Study 1 ( $M$  = 13.97 years;  $SD$  = 2.62) as compared to Study 2 ( $M$  = 12.22 years;  $SD$  = 2.40) and Study 3 ( $M$  = 12.56 years;  $SD$  = 3.26), a difference which was statistically significant,  $F(2, 98) = 3.85, p = .025$ .

## Measures

**Emotion Regulation Questionnaire (ERQ):** The ERQ (Gross and John 2003) is a 10 item self-report measure developed to assess distinct differences in the characteristic use of two emotion regulation strategies: cognitive reappraisal and expressive suppression. Each statement is rated on a 7-point Likert scale ranging from “1-strongly disagree” to “7-strongly agree.” The reappraisal factor consists of six items intended to evaluate how individuals redefine an emotionally eliciting situation such that its emotional impact is modified. The suppression factor consists of four items intended to measure how often individuals regulate emotions by inhibiting emotional expression. The reappraisal and suppression subscales were scored by computing the mean of the relevant items. In the current sample, the ERQ has good internal consistency across the two subscales: Reappraisal ( $\alpha = .82$ ) and Suppression ( $\alpha = .64$ ). Gross and John (2003) reported alpha reliabilities averaged .79 for Reappraisal and .73 for Suppression, and test-retest reliability across 3 months was .69 for both scales.

**Difficulties with Emotion Regulation Scale (DERS):** The DERS (Gratz and Roemer 2004) is a 36 item self-report measure developed to evaluate difficulties in emotion regulation. Items are scored on six factors associated with emotion dysregulation: Non-acceptance of Emotional Responses (Non-acceptance); Difficulties Engaging in Goal-Directed Behavior (Goals); Impulse Control Difficulties (Impulse); Lack of Emotional Awareness (Awareness); Limited Access to Emotion Regulation Strategies (Strategies); and Lack of Emotional Clarity (Clarity). Each statement is rated on a 5-point Likert scale ranging from “1-almost never” to “5-almost always.” The subscales were all scored by summing the relevant items, and the total score was computed by summing the subscales. In the current sample, the DERS had good internal consistency ( $\alpha = .94$ ). Gratz and Roemer (2004) reported an internal consistency of .93 and a test-retest reliability of .88 during a 4-week to 8-week interval. This model of emotion dysregulation has good validity and reliability in different cultural, clinical, and non-clinical samples (Giromini et al. 2012; Gratz et al. 2006; Tull et al. 2009; Tull et al. 2015).

**Parental Reflective Functioning Questionnaire (PRFQ):** The PRFQ (Luyten et al. 2017) consists of 18 statements that participants are asked to rate while keeping their child in mind. The statements are separated into three scales (with six items for each subscale): parents’ *interest and curiosity* about their child’s mental states (e.g., “I wonder a lot about what my child is thinking and feeling”), parents’ *pre-mentalizing* or difficulties in recognizing mental states and their impact on behavior in their child (e.g., “The only time I’m certain my child loves me is when he or she is smiling at me”), and parents’ *certainty* of understanding their child’s

mental world (e.g., “I always know what my child wants”). A 7-point Likert scale from “1-strongly disagree” to “7-strongly agree” is used to capture responding to each PRFQ item. The subscales were scored by computing the mean of the respective items. In the current sample, the PRFQ has acceptable internal consistency across the subscales: pre-mentalizing ( $\alpha = .73$ ), certainty ( $\alpha = .67$ ), and interest and curiosity ( $\alpha = .64$ ). Prior work has also evidenced associations between the PRFQ and constructs related to parenting and attachment (Burkhart et al. 2017; Luyten et al. 2017; Rutherford et al. 2013, 2015a).

## Data Analyses

The SPSS Statistics 24.0 package was used for all analyses. Prior to conducting analyses, we examined the distribution of our variables. Pre-mentalizing was positively skewed and Interest and Curiosity was negatively skewed; this issue was addressed by conducting a LOG transformation and power (exponential) transformation respectively, which restored the variables to normality. All other variables were normally distributed. Descriptive statistics were calculated with respect to demographic characteristics: bivariate correlations were applied to examine the associations between the demographic, ERQ, DERS, and PRFQ measures. The correlations were intended to inform on the multiple regression analyses (backwards elimination) conducted to evaluate how well the ER measure subscales associated with the PRFQ subscales. Therefore, regressions were only conducted if the predictor and outcome were correlated at a level of statistical significance. Any demographic variables that were correlated ( $p < .05$ ) with the predictor or outcome were included as covariates in analyses.

## Results

### ERQ and PRFQ

Table 1 presents the descriptive statistics and correlations between demographic, ERQ, and PRFQ measures: the ERQ subscale of reappraisal was negatively correlated with pre-mentalizing, the ERQ subscale of suppression was positively correlated with pre-mentalizing, and with the exception of maternal education and age, demographic factors were only weakly correlated with our ERQ and PRFQ scores. Study number was not significantly correlated with the ERQ or PRFQ scores.

In regression analyses (backwards elimination, with a removal criteria of  $p > .10$ ) to first explore whether the emotion regulation strategies were associated with pre-mentalizing, both ERQ subscales and education were entered as predictors. The most parsimonious model

**Table 1** Descriptive data and correlations between demographic data, PRFQ, and ERQ ( $n = 97$ )

	M (SD)	1	2	3	4	5	6	7	8	9
1. Study number	1.80 (0.89)									
2. Maternal age	28.53 (6.92)	0.14								
3. Parity	1.72 (0.84)	0.11	0.16							
4. Education	13.25 (2.88)	-0.31**	0.33**	-0.14						
5. Infant's age	6.17 (3.30)	0.14	0.08	-0.03	-0.14					
6. Interest and curiosity	5.80 (0.95)	-0.05	0.04	-0.17	0.20*	-0.04				
7. Pre-mentalizing	1.62 (0.76)	0.18	-0.03	0.03	-0.07	0.08	-0.21*			
8. Certainty	4.00 (1.21)	0.09	-0.24*	0.01	-0.13	0.12	0.14	0.00		
9. Reappraisal	5.20 (1.25)	-0.15	0.08	0.02	0.24*	0.07	0.19	-0.21*	-0.06	
10. Suppression	3.26 (1.31)	0.13	0.00	0.12	-0.07	-0.04	-0.18	0.25*	0.14	0.01

\* $p < .05$ ; \*\* $p < .01$ **Table 2** Backward elimination regression model predicting PRFQ Pre-mentalizing from ERQ reappraisal and suppression and education

	Predictors	Beta	Significance
<i>Model 1</i>	$F(3,95) = 4.34, p = 0.007$		
$R^2 = 0.12$	Suppression	0.04	0.001
	Reappraisal	-0.02	0.09
	Education	-0.002	0.70
<i>Model 2</i>	$F(2,95) = 6.49, p = 0.002$		
$R^2 = 0.12$	Suppression	0.04	0.001
	Reappraisal	-0.02	0.09

evidenced that an increase in suppression ( $\beta = .04$ ,  $p = .001$ ), and a trend to a decrease in reappraisal ( $\beta = -.02$ ,  $p = .09$ ), was associated with a greater tendency to endorse pre-mentalizing,  $F(2,95) = 6.49$ ,  $p = .002$ ,  $R^2 = .12$  (Table 2).

## DERS and PRFQ

Table 3 presents the descriptive statistics and correlations between demographic, DERS, and PRFQ measures: all of the DERS subscales were modestly positively correlated with pre-mentalizing, the DERS subscale of awareness was negatively correlated with interest and curiosity, the DERS subscale of goals was negatively correlated with certainty, and with the exception of maternal age and education, demographic factors were only weakly correlated with our PRFQ and DERS scores. Unexpectedly, study number was associated with the DERS subscale of strategies; specifically, strategies scores were slightly higher in Study 2 ( $M = 16.33$ ;  $SD = 7.70$ ) as compared to Study 1 ( $M = 12.94$ ;  $SD = 5.96$ ) and Study 3 ( $M = 14.61$ ;  $SD = 6.21$ ), although this

difference not statistically significant,  $F(2,95) = 2.32$ ,  $p = .10$ . Our regression model, described below, was comparable with the inclusion and exclusion of study number as an associated variable, even when accounting for demographic covariates, and therefore we report the model without study number included.

Given that all the DERS subscales modestly correlated with pre-mentalizing, a regression (backwards elimination, with a removal criteria of  $p > .10$ ) was employed with all the DERS subscales, maternal education, and maternal age as predictors. The most parsimonious model indicated that an increase in non-acceptance ( $\beta = .01$ ,  $p = .01$ ) and lack of emotional clarity ( $\beta = .01$ ,  $p = .02$ ) was associated with a greater tendency to endorse pre-mentalizing,  $F(2,95) = 14.01$ ,  $p = .001$ ,  $R^2 = .23$  (Table 4). Given that the DERS subscale awareness correlated with interest and curiosity, a second regression was employed. When including education ( $\beta = .59$ ,  $p = .09$ ), a higher tendency to lack emotional awareness ( $\beta = -.72$ ,  $p = .001$ ) was associated with lower interest and curiosity in the child's mental states,  $F(2,95) = 8.70$ ,  $p = .001$ ,  $R^2 = .16$  (Table 5). Given that the DERS subscale of goals correlated with certainty, a final regression was employed. When including maternal age ( $\beta = -.04$ ,  $p = .01$ ), greater difficulty setting goals ( $\beta = -.07$ ,  $p = .01$ ) was associated with less maternal certainty in understanding their infant's mental states,  $F(2,96) = 5.97$ ,  $p = .004$ ,  $R^2 = .11$  (Table 6).

## Discussion

For adaptive parenting to be successful, emotion regulation becomes an important tool given the stress caregiving brings. This added stress continues throughout the child's

**Table 3** Descriptive data and correlations between demographic data, PRFQ, and DERS ( $n = 97$ )

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Study number	1.80 (0.89)														
2. Maternal age	28.53 (6.92)	0.14													
3. Parity	1.72 (0.84)	0.11	0.16												
4. Education	13.25 (2.88)	-0.31**	0.33**	-0.14											
5. Infant's age	6.17 (3.30)	0.14	0.08	-0.03	-0.14										
6. Interest and curiosity	5.80 (0.95)	-0.05	0.04	-0.17	0.20*	-0.04									
7. Pre-mentalizing	1.62 (0.76)	0.18	-0.03	0.03	-0.07	0.08	-0.21*								
8. Certainty	4.00 (1.21)	0.09	-0.24*	0.01	-0.13	0.12	0.14	0.00							
9. Non-acceptance	10.26 (4.40)	0.07	0.05	0.03	-0.01	0.12	0.05	0.47**	-0.09						
10. Goals	10.92 (4.59)	0.17	-0.08	-0.05	-0.10	-0.04	0.02	0.37**	-0.21*	0.38**					
11. Impulse	10.41 (4.93)	0.15	-0.06	0.07	-0.26*	0.05	-0.07	0.39**	0.02	0.54**	0.62**				
12. Awareness	13.79 (6.21)	0.05	-0.15	0.01	-0.18	-0.01	-0.37**	0.26*	-0.07	0.27**	0.28**	0.37**			
13. Strategies	14.10 (6.21)	0.20*	-0.01	0.03	-0.20*	0.08	-0.02	0.38**	-0.10	0.62**	0.67**	0.82**	0.35**		
14. Clarity	9.08 (3.76)	0.04	-0.14	0.08	-0.20	0.18	-0.09	0.49**	0.05	0.50**	0.53**	0.61**	0.49**	0.63**	
15. DERS total	68.57 (22.06)	0.17	-0.06	0.07	-0.22*	0.07	-0.10	0.49**	-0.10	0.68**	0.75**	0.85**	0.59**	0.89**	0.80**

\* $p < .05$ ; \*\* $p < .01$

**Table 4** Backward elimination model predicting PRFQ Pre-mentalizing from DERS clarity and non-acceptance subscales and associated demographic factors

	Predictors	Beta	Significance
<b>Model 1</b>	$F(8,95) = 4.06, p = 0.001$		
$R^2 = 0.27$	Clarity	0.007	0.30
	Non-acceptance	0.01	0.01
	Goals	0.007	0.14
	Impulse	0.006	0.38
	Awareness	0.004	0.28
	Strategies	-0.008	0.13
	Education	-0.001	0.85
	Maternal Age	-0.001	0.74
<b>Model 2</b>	$F(7,95) = 4.70, p = 0.001$		
$R^2 = 0.27$	Clarity	0.007	0.29
	Non-acceptance	0.01	0.01
	Goals	0.007	0.13
	Impulse	0.006	0.34
	Awareness	0.004	0.27
	Strategies	-0.008	0.12
	Maternal Age	-0.001	0.69
<b>Model 3</b>	$F(6,95) = 5.50, p = 0.001$		
$R^2 = 0.27$	Clarity	0.007	0.24
	Non-acceptance	0.01	0.01
	Goals	0.007	0.13
	Impulse	0.006	0.35
	Awareness	0.004	0.26
	Strategies	-0.008	0.12
<b>Model 4</b>	$F(5,95) = 6.43, p = 0.001$		
$R^2 = 0.26$	Clarity	0.008	0.16
	Non-acceptance	0.01	0.007
	Goals	0.008	0.12
	Awareness	0.004	0.26
	Strategies	-0.005	0.22
<b>Model 5</b>	$F(4,95) = 7.80, p = 0.001$		
$R^2 = 0.25$	Clarity	0.01	0.04
	Non-acceptance	0.01	0.01
	Goals	0.007	0.12
	Strategies	-0.005	0.26
<b>Model 6</b>	$F(3,95) = 9.79, p = 0.001$		
$R^2 = 0.24$	Clarity	0.01	0.07
	Non-acceptance	0.01	0.02
	Goals	0.004	0.26
<b>Model 7</b>	$F(2,95) = 14.01, p = 0.001$		
$R^2 = 0.23$	Clarity	0.01	0.02
	Non-acceptance	0.01	0.01

development and is not limited to early infancy. Nevertheless, we focus on the initial two years postpartum when parents have confronted the challenge of handling their own

**Table 5** Backward elimination regression model predicting PRFQ interest and curiosity from DERS awareness subscale and education

Predictors		Beta	Significance
<i>Model 1</i> $F(2,95) = 8.70, p = 0.001$			
$R^2 = 0.16$	Education	0.59	0.09
	Awareness	-0.72	0.001

**Table 6** Backward elimination regression model predicting PRFQ certainty from DERS goals subscale and maternal age

Predictors		Beta	Significance
<i>Model 1</i> $F(2,96) = 5.97, p = 0.004$			
$R^2 = 0.11$	Maternal age	-0.04	0.01
	Goals	-0.07	0.01

emotions while also caring for a distressed infant in a sensitive and emotionally encouraging role. We chose to focus on this time period due to the particular difficulty that emerges since infants are restricted in their communicative bids to explain their underlying physical, cognitive, and affective states. The added stress a new infant creates and the parent's own ability to self-regulate could have potentially important consequences on the child's healthy development. Emotion regulation is connected to many cognitive capacities essential to parenting (Rutherford et al. 2015b) and we focused on the association between emotion regulation and parental reflective functioning. Due to parents needing to rely on the infant's non-verbal signals in early development, parental reflective functioning is particularly challenging during this time (Luyten et al. 2012). While emotion regulation is believed to be important in scaffolding mentalization and reflective functioning (Slade 2005), research is needed to begin to document the possible relationship between these constructs. Therefore, we investigated whether emotion regulation strategies and difficulties with emotion regulation were associated, even when accounting for demographic covariates, with parental reflective functioning by employing self-report measures in a community sample of mothers. In confirmation of the hypotheses, it was found that (1) expressive suppression was associated with higher levels of pre-mentalizing; (2) parental difficulties with emotion regulation were significantly associated with pre-mentalizing; (3) a higher lack of emotional awareness was associated with lower interest and curiosity in the child's mental states; and (4) when including maternal age, greater difficulty setting goals was negatively associated with less capacity to recognize that infant mental states are not transparent. Cognitive reappraisal was also correlated with, but not significantly associated with, pre-mentalizing.

The central findings reflected associations between the emotion regulation measures and pre-mentalizing. Specifically, regression analyses for the ERQ subscales associated with the PRFQ subscales evidenced that mothers reporting a greater tendency to suppress emotions reported higher levels of pre-mentalizing. Furthermore, all of the DERS subscales capturing difficulties with emotion regulation were associated with levels of pre-mentalizing. Pre-mentalizing refers to circumstances where parents may find it difficult to identify their infant's mental states, possibly leading to developmental insensitivity, or attribution of malevolent explanations, concerning their infant's mental states (Fonagy et al. 1991). Although expressive suppression measured here was considered a regulation strategy, it may also be associated with emotion dysregulation, given that it can be maladaptive in emotionally-charged contexts (D'Agostino et al. 2017). Therefore, emotion dysregulation as well as employing expressive suppression may present an obstacle to mentalization during mother-child interactions. In partial support of this notion, Edwards et al. (2017) reported that higher levels of maternal suppression and poorer levels of maternal reappraisal were indirectly associated with higher infant negative affect (through maternal internalizing difficulties). Taken together, these findings and the current study indicate that targeting emotion regulation could possibly promote mentalization between mother-child interactions and assist the external emotion regulation that infants need early in their development.

Given the consistency in the association between expressive suppression, dysregulation, and pre-mentalizing, these findings suggest the importance of targeting emotion regulation to help mothers in assuming a deliberate and developmentally-sensitive perspective during interactions with their child. Given that theorists propose mentalizing is more difficult when emotions are extreme (Fonagy et al. 2002), it is not surprising that mothers who have difficulty self-regulating also find mentalizing challenging. Consistent with this notion, parental self-reported difficulties in recognizing and employing effective and situationally suitable emotion regulation strategies are also inversely connected to constructive and cooperative behaviors with the child (Shaffer and Obradovic 2017). This is seen in the current study where mothers who reported difficulty regulating their emotions also had higher levels of pre-mentalizing, which could also impact parenting behavior. Parental reflective functioning also directly relates to parenting, where parents who use reflective functioning have more essential knowledge to respond thoughtfully to the child (Suchman et al. 2010). When mothers' were able to parse out their own emotions while parenting, they were more likely to ensure their children's safety, socially engage with their children, play sensitively with their children, and communicate in a developmentally appropriate way

(Suchman et al. 2010). Relatedly, increases in maternal sensitivity also increase the chances of child developing a secure attachment (De Wolff and van IJzendoorn 1997), which influences developmental outcomes, such as social relatedness, arousal modulation, and curiosity (Sroufe 2005). Therefore, targeting emotion regulation could support maternal mentalization, sensitive attunement, and child development.

We also found that, when including education, mothers who endorsed less emotional awareness also reported lower levels of interest and curiosity in their child's mental states. Such an association suggests that mothers who may be unaware of their own emotions may have decreased awareness of their child's emotions, manifesting here as a decreased level of interest and curiosity in their child's mental states. This resonates with the proposed importance of distinguishing between parental reflective functioning as it relates to the self and the child, focusing on self-focused reflective functioning as an important first step in optimizing outcomes for parents and their developing child (Suchman et al. 2010). While intuitive, these findings suggest there may also be value to developing approaches to help improve emotional attentiveness to enable parental reflective functioning with positive benefits to child development. Indeed, a child's eventual feeling of safety is thought to be related to a mother's ability to regulate the infant's distress (Lyons-Ruth and Spielman 2004). Furthermore, Luyten et al. (2017) found that maternal interest and curiosity was strongly associated with infant attachment, and that the chances of having a child with a secure attachment were 2.64 times higher for mothers with higher levels of interest and curiosity than lower levels. Mentalization-based interventions, such as *Minding the Baby*®, have shown that mothers in the intervention (as compared to the control group that received standard health visits) were more prone to have children with a secure attachment (Sadler et al. 2013). Taken together, supporting a mother's level of emotional awareness and capacity to adjust her emotions could in turn support interest and curiosity in her child's mental states, which may help the child's feeling of safety and the development of a secure attachment. Importantly, education also played a role in this model, although the beta did not reach statistical significance. A possible explanation for the finding is that individuals with more education may have greater levels of interest, which serves long-term goals of cultivating knowledge (Silvia 2001). Perhaps this increase in general interest could translate to an increased interest and curiosity in children's mental states as well.

In the current study it was also found that, when including maternal age, greater difficulty setting goals was negatively connected with maternal certainty concerning her infant's mental states. These results suggest that

maternal difficulties making goals may worsen maternal uncertainty of their child's mental state. Difficulty in setting goals may reflect heightened levels of emotion dysregulation that impacts mothers' capacity to understand mental states in their child, perhaps leading to feelings of being overwhelmed with being unable to complete goal-directed behaviors, which impact mentalization. Greater emotion regulation through the lens of setting goals may result in improved reflective functioning since the capability to regulate internally could permit the parent to continue with behavior aimed at reaching their set goals, which may include caregiving behaviors. These findings are important theoretically in advancing our understanding of emotion regulation and reflective functioning, as well as therapeutically in the design and implementation of parenting intervention programs that employ mentalization-based approaches. While several interventions have targeted reflective functioning (Pajulo et al. 2012; Suchman et al. 2017; Suchman et al. 2011; Sled et al. 2013), the current study suggests that focusing interventions on emotion regulation and goal development may better support the development of maternal mentalization. Notably, maternal age also played a role in this model, with older mothers reporting less certainty in their child's mental states. Although perhaps counterintuitive, such a finding may reflect, chronologically, greater experience in social interactions and the recognition of the opacity of mental states. However, future research is required to both replicate and extend this demographic correlate with maternal certainty as measured by the PRFQ.

## Limitations

A limitation of this work is that to assess emotion regulation and reflective functioning we employed self-report measures. To advance this work, including behavioral and neuroimaging methods of emotion regulation would be valuable, which would comprise the use of tasks where participants are told to suppress or reappraise their emotional responses (De Castella et al. 2017; McRae et al. 2012; Ochsner et al. 2002). The PRFQ may also be complemented by the Parent Development Interview to further define the mother's capability for reflective functioning (Slade et al. 2003). Given that it has been found that both maternal self-regulation and maternal psychopathology are connected to parenting difficulties (Bridgett et al. 2011; Bridgett et al. 2015; Deater-Deckard et al. 2010; Nicol-Harper et al. 2007), it would be important in future research to investigate how these clinical symptoms may influence the relation between emotion regulation and parental reflective functioning. For instance, Riva Crugnola et al. (2016) found links between depression, anxiety, and emotion regulation in mothers of 3-month old infants, and these were



connected with a struggle in regulating negative emotions throughout an interaction between infant and mother. Our samples consisted only of mothers, and further research is needed to study the associations between emotion regulation and parental reflective functioning in fathers as well as mothers, non-biological and biological parents, and expectant and recent parents. Such studies would shed light on the role of biological and experiential factors that may form the basis for parental emotion regulation and reflective functioning. An important limitation is the directionality of the findings. Since this study was cross-sectional in design, and not longitudinal, the results could also be explained as poorer mentalization being associated with lower emotion regulation abilities. The dynamics of parent-child relationships are complex and bi-directional; therefore, longitudinal studies of mothers and their infants incorporating repeated measures over time are warranted.

In summary, the current study contributes to the literature on parenting by introducing findings that support an association between parental emotion regulation and reflective functioning. Our main findings suggest that (1) mothers with higher tendencies to suppress emotions, and with more difficulties with emotion regulation, will engage in greater levels of pre-mentalizing; (2) mothers with poorer emotional awareness will evidence less interest and curiosity in their child's mental states; and (3) mothers with greater difficulty setting goals may also evidence a reduced certainty to recognize and understand their infant's mental states. While this study lays the groundwork for future empirical investigations unpacking the connection between parental emotion regulation and reflective functioning, the findings also emphasize the importance of parenting interventions to focus on emotion regulation and mentalization to support parent and child development.

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### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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